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EXAMINER

CALEY, MICHAEL H

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2871

DATE MAILED: 12/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/936,999

Applicant(s)

NAKAMURA ET AL.

Examiner

Michael H. Caley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-6 and 10-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 4-6 and 10-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 10 and 14 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for providing desired ranges for the maximum and minimum transmission and reflection properties of the reflecting layer and the diffusing layer, does not reasonably provide enablement for the construction of such an apparatus to achieve these transmission and reflection results. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. The specification does not provide support for the limitations “a difference between the maximum and the minimum of a transmittance of the light diffusing layer is not larger than 20% in a visible light region” and “a difference between the maximum and the minimum of a reflectance of the reflecting layer is not larger than 20% in a visible light region”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 10, 11, 14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata et al. (U.S. Patent No. 6,111,699 "Iwata") in view of Miyamoto et al. (U.S. Patent No. 6,147,733 "Miyamoto").

Regarding claim 4, Iwata discloses a liquid crystal display having:

- a liquid display panel which sandwiches a liquid crystal layer between a first substrate and a second substrate (Figure 15 elements 104);

- a reflecting layer which is mounted on the first substrate and reflects light (Figure 15 element 112); and

- a light diffusing layer which is mounted on the second substrate (Figure 15 element 102).

Iwata fails to explicitly disclose the transmission spectral characteristics of a visible light region of the light diffusing layer as made to match the reflection spectral characteristics of a visible light region of the reflecting layer. Miyamoto, however, details such a condition as desirable in a liquid crystal display in order to achieve a satisfactory color tone and lightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). Miyamoto teaches diffusers and reflectors that achieve the proposed spectral characteristics (Figures 8-11 and 13-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have matched the transmission spectral characteristics of the light diffusing layer to the reflection spectral characteristics of a visible light region of the reflecting layer. As taught by Miyamoto, a diffuser that transmits light uniformly over the visible spectral range in combination

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with a reflector that reflects light uniformly over the visible spectral range is desirable in liquid crystal displays to produce consistent color tones and brightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). One would have been motivated to ensure such a matching between the diffuser and the reflector in order to reproduce colors accurately through the display and provide a pleasing image.

The Examiner notes that the recited spectral matching between the light diffusing layer and the reflecting layer does not specify a degree or characteristic of such matching and thus does not significantly further limit the claim. Any diffuser that is generally transmissive over the visible spectral range in combination with a reflector that is generally reflective over the same range is considered to fall within the scope of the limitation.

Regarding claims 10, 11, 14, and 19, Iwata discloses all of the proposed limitations except for a difference between the maximum and the minimum of a transmittance of the light diffusing layer as not larger than 20% in a visible light region and a difference between the maximum and the minimum of a reflectance of the reflecting layer as not larger than 20% in a visible light region. Miyamoto, however, details such a condition as desirable in a liquid crystal display in order to achieve a satisfactory color tone and lightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). Miyamoto teaches diffusers and reflectors that achieve the proposed spectral characteristics (Figures 8-11 and 13-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the diffuser and reflector such that they have a uniform transmittance and reflectance respectively across the visible spectral range. As taught by

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Miyamoto, a diffuser that transmits light uniformly over the visible spectral range in combination with a reflector that reflects light uniformly over the visible spectral range is desirable in liquid crystal displays to produce consistent color tones and brightness (Column 1 line 66 to Column 2 line 8, Column 3 lines 18-30). One would have been motivated to ensure such a matching between the diffuser and the reflector in order to reproduce colors accurately through the display and provide a pleasing image.

The Examiner notes that such a uniform spectral characteristic in the reflector and the diffuser is a design objective generally common to liquid crystal displays of similar construction as a means of achieving proper coloring and brightness. As noted above, the specification and claim fail to distinguish a novel feature of the diffuser and reflector which would enable one of ordinary skill to construct a diffuser and reflector with such a uniform spectral characteristic beyond that of the prior art. Therefore, the subject matter of claims 4, 10, and 14 does not appear to be novel.

Regarding claim 17, Iwata discloses the light diffusing material as organic material particles (Column 8 lines 46-67).

Regarding claim 18, Iwata discloses the light diffusing material as inorganic material particles (Column 8 lines 46-67).

Regarding claim 20, Iwata discloses a diameter of the light diffusing material as in a range of 3 μm to 10 μm (Column 8 lines 46-67).

Claims 5, 6, 12, 13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwata in view of Miyamoto and in further view of Woodgate et al. (U.S. Patent No. 6,483,613 “Woodgate”).

Regarding claims 5, 12, and 15, Iwata and Miyamoto fail to disclose an auxiliary light source for illuminating an upper surface of a liquid crystal display panel and an input device for inputting data as arranged over the light diffusing layer. Woodgate, however, teaches such a configuration of elements as advantageous in a portable liquid crystal device such as a personal digital assistant (PDA) (Abstract, Column 1 lines 15-40; Figures 10A-10H).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the reflective liquid crystal display device disclosed by Iwata as a PDA having an auxiliary light source and an input device arranged over the diffusing layer. One would have been motivated to provide an input device given the reflective display's advantageous use as a PDA as a energy conserving device (Column 1 lines 25-28). Furthermore, one would have been motivated to include an auxiliary light source as a means of improving the performance of the display in poorly lit conditions (Column 1 lines 33-34).

Regarding claims 6, 13, and 16, Iwata and Miyamoto fail to disclose color filter films as provided to an inner surface of either one of the first substrate or the second substrate. Woodgate, however, teaches such a color filter in a similarly constructive reflective liquid crystal display (Figure 9A element 64).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed a color filtering device as proposed. One would have been motivated to include a color filtering device as a means of realizing a reflective color liquid crystal display. Such an improvement would have been advantageous to display color images, improving the versatility of the device. One would have been motivated to provide color in such a way to the device disclosed by Iwata in order to improve its marketability by providing a more visually pleasing display.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (703) 305-7913. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



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